GAC Chemical Corporation **Waldo County** **Searsport, Maine** **A-171-71-K-A**	**Departmental** **Findings of Fact and Order** **Air Emission License** **Amendment #1**

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

1. GAC Chemical Corporation (GAC) of Searsport, Maine was issued Air Emission License A-171-71-J-M/R on February 28, 2000, permitting the operation of emission sources associated with their chemical manufacturing facility.

2. GAC has requested an amendment to their license in order to:

   a. Install a Sodium Hypochlorite production system
   b. Reduce the licensed annual fuel limit for the boilers
   c. License the firing of small amounts of waste oil in the boilers

B. Application Classification

This modification is determined to be a minor modification and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Air Regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in Chapter

100 of the Air Regulations. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Sodium Hypochlorite Process Description

GAC is proposing to install equipment for the production of Sodium Hypochlorite solution. Sodium Hypochlorite is produced from Sodium Hydroxide and Chlorine according to the following reaction:

$$2NaOH + Cl_2 \rightarrow NaOCl + NaCl + H_2O + Heat$$

1. Equipment

Chlorine is received in 90 ton rail cars which are connected directly to the production process. The connection to the rail car is equipped with an emergency rail car closure system. The Powell manufactured system uses air driven motors to close the rail car valves. The air supply to the air motors is controlled by fail-open electric solenoid valves. An air supply reservoir with an upstream check valve provides a sufficient volume of compressed air to close the rail car valves during a power outage or if there is a problem with the compressed air source.

The chlorine supply line includes two expansion bottle assemblies to protect the integrity of the pipeline in the event that trapped chlorine in the line experiences thermal expansion. Each expansion bottle assembly includes a steel ASME cylinder, a rupture disc rated at 300 psig located between the assembly mount on the pipeline and the expansion bottle, and a rupture detection pressure switch located on the expansion bottle side of the rupture disk. The volume of each expansion bottle is more than sufficient to accommodate the expansion of the liquid chlorine in the respective chlorine pipe section.

The production unit is a skid-mounted assembly manufactured by Powell. Included on the unit are the sodium hydroxide dilution system, the sodium hydroxide dilution heat exchanger, the sodium hypochlorite reaction loop, and the sodium hypochlorite reaction heat exchanger. The nominal production rate limit of the sodium hypochlorite production unit is 70 gallons per minute of 12.5% by weight sodium hypochlorite solution.

The production unit vents to a Powell ProVent Chlorine/Sulfur Dioxide Scrubber. The scrubber is also a skid-mounted unit which includes the scrubber sparger/recirculation tank, the recirculation pump, the chlorine eductor, and the ORP probes.

2. Monitoring

The chlorine rail car is monitored by three chlorine detectors. The three detectors will be arranged in a triangle with one on one side of the rail car and two evenly spaced on the opposite side. Two chlorine detectors will be located inside the production building, one on the scrubber and one near the chlorine flow control valve.

All five detectors will be set to alarm at 2 ppm of chlorine. A chlorine level detected at or above the setpoint on any of the five detectors will generate an emergency shutdown of the chlorine transfer system and will activate the chlorine rail car closure system. Visual and audible alarm warning devices will also be activated.

The automatic closure system will be activated by any of the following:

- Ambient chlorine detected at or above the alarm set point by any one of the chlorine detectors at the rail car.
- Ambient chlorine detected at or above the alarm set point by any one of the chlorine detectors in the production building.
- Detection of movement of the rail car.
- Electrical power loss.
- Air supply pressure drops below a low set point.
- High chlorine supply pressure transient.
- Any emergency stop command in the sodium hypochlorite facility.
- High ORP values in the sodium hypochlorite production unit.
- High ORP values in the scrubber system.

3. BACT

A summary of the BACT analysis for the Sodium Hypochlorite Production System is the following:

1. GAC shall operate the scrubber system at all times that the Sodium Hypochlorite Production System is operating.

2. A pressure of 500 psig shall not be exceeded in the chlorine handling system. GAC shall record the pressure in the chlorine transfer line once per day for each day that the Sodium Hypochlorite Production System is operating. GAC shall report to the Department within 2 working days if this limit is exceeded.
3. The emergency closure system shall be tested once per quarter to ensure operability and readiness of the emergency system. GAC shall keep records of all emergency closure system tests and actuations.
4. Each chlorine detector shall be tested twice per year to ensure operability and readiness. GAC shall keep records of all chlorine detector tests.
5. Prior to each day's production start-up, the connections and rail car valves shall be checked for chlorine leaks by misting with weak aqueous ammonia. If any leaks are detected, the problem with the associated device or connection shall be corrected and retested before production start-up. GAC shall keep daily logs of leak inspections and any required corrective action.
6. GAC shall keep records of all expansion bottle inspections and maintenance activities including replacement of rupture disks.
7. GAC shall keep records of all maintenance activities on the rail car closure system, production unit, and scrubber system.

C. Boilers

GAC has requested the amending their license to include the firing of small quantities of waste oil from their maintenance operations as well as to decrease the annual fuel limit for the boilers from 850,000 gal/year of fuel oil to 600,000 gal/year.

A summary of the BPT analysis for Boiler #1 (20.7 MMBtu/hr) and Boiler #2 (6.9 MMBtu/hr) is the following:

1. GAC is licensed to fire #2, #5, and #6 fuel oil with a sulfur content not to exceed 0.7% by weight. GAC is also licensed to fire waste oil from its maintenance operations.
2. The total fuel use for the facility shall not exceed 600,000 gal/year fuel oil based on a 12 month rolling total.
3. GAC shall not exceed the firing of 300 gal/year of waste oil based on a 12 month rolling total demonstrated by records of waste oil collected and transferred to the fuel oil storage tank.
4. Chapter 106 regulates fuel sulfur content, however the use of 0.7% sulfur by weight fuel is more stringent and shall be used.
5. Chapter 103 regulates PM emission limits. The PM_{10} limits are derived from the PM limits.

6. NO_x emission limits are based on data from similar boilers of this size and age.
7. CO and VOC emission limits are based upon AP-42 data dated 9/98
8. Visible emissions from the boilers shall not exceed 30% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

D. Annual Emission Restrictions

GAC shall be restricted to the following annual emissions, based on a 12 month rolling total:

Total Allowable Annual Emission for the Facility
(used to calculate the annual license fee)

Pollutant	**Tons/Year**
PM	6.6
PM_{10}	6.6
SO_2	33.0
NO_x	13.5
CO	1.5
VOC	0.1

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-171-71-K-A subject to the conditions found in Air Emission License A-171-71-J-M/R and in the following conditions:

The following shall replace Condition (16) of Air Emission License A-171-71-J-M/R:

(16) **Boilers #1 & #2**

A. Capacity shall not exceed 20.7 MMBtu/hr for Boiler #1 and 6.9 MMBtu/hr for Boiler #2.
B. GAC is licensed to fire #2, #5, and #6 fuel oil with a sulfur content not to exceed 0.7% by weight. GAC is also licensed to fire waste oil from its maintenance operations.
C. The total fuel use for the facility shall not exceed 600,000 gal/year fuel oil based on a 12 month rolling total. Fuel use records shall be maintained on site on a monthly basis, in addition to the 12 month rolling total.
D. GAC shall not exceed the firing of 300 gal/year of waste oil based on a 12 month rolling total demonstrated by records of waste oil collected and transferred to the fuel oil storage tank.
E. Emissions shall not exceed the following:

Equipment		**PM**	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Boiler #1	lb/MMBtu	0.12	0.12	-	-	-	-
	lb/hr	2.48	2.48	15.17	6.21	0.69	0.04
Boiler #2	lb/MMBtu	0.12	0.12	-	-	-	-
	lb/hr	0.83	0.83	5.06	2.07	0.23	0.01

F. Visible emissions from Boilers #1 & 2 shall not exceed 30% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

The following are new Conditions:

(23) Sodium Hypochlorite Production

A. GAC shall operate the scrubber system at all times that the Sodium Hypochlorite Production System is operating.
B. A pressure of 500 psig shall not be exceeded in the chlorine transfer system. GAC shall record the pressure in the chlorine transfer line once per day for each day that the Sodium Hypochlorite Production System is operating. GAC shall report to the Department within 2 working days if this limit is exceeded.
C. The emergency closure system shall be tested once per quarter to ensure operability and readiness of the emergency system. GAC shall keep records of all emergency closure system tests and actuations.
D. Each chlorine detector shall be tested twice per year to ensure operability and readiness. GAC shall keep records of all chlorine detector tests.
E. Prior to each day's production start-up, the connections and rail car valves shall be checked for chlorine leaks by misting with weak aqueous ammonia. If any leaks are detected, the problem with the associated device or connection shall be corrected and retested before production start-up. GAC shall keep daily logs of leak inspections and any required corrective action.
F. GAC shall keep records of all expansion bottle inspections and maintenance activities including replacement of rupture disks.
G. GAC shall keep records of all maintenance activities on the rail car closure system, production unit, and scrubber system

(24) This amendment shall expire concurrently with Air Emission License A-171-71-J-M/R.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2001.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
MARTHA G. KIRKPATRICK, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 2/12/01
Date of application acceptance: 2/12/01

Date filed with the Board of Environmental Protection: _____

This Order prepared by Lynn Ross, Bureau of Air Quality.